08-08-05

AF
2813
JPW

PTO/SB/21 (09-04)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	09/754,926
Filing Date	January 4, 2001
First Named Inventor	Kie Y. Ahn
Art Unit	2813
Examiner Name	Kielin, Erik J.
Attorney Docket Number	MI22-1533

Total Number of Pages in This Submission

ENCLOSURES *(Check all that apply)*

- [ ] Fee Transmittal Form
  - [ ] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
- [ ] Express Abandonment Request
- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Reply to Missing Parts/ Incomplete Application
  - [ ] Reply to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
- [ ] Licensing-related Papers
- [ ] Petition
- [ ] Petition to Convert to a Provisional Application
- [ ] Power of Attorney, Revocation Change of Correspondence Address
- [ ] Terminal Disclaimer
- [ ] Request for Refund
- [ ] CD, Number of CD(s) ________
  - [ ] Landscape Table on CD
- [ ] After Allowance Communication to TC
- [ ] Appeal Communication to Board of Appeals and Interferences
- [x] Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- [ ] Proprietary Information
- [ ] Status Letter
- [x] Other Enclosure(s) (please Identify below):

Return receipt postcard; Response to July 25, 2005 Notification of Non-Compliant Appeal Brief; Amended Brief of Appellant

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Wells St. John P.S.		
Signature	Jennifer J. Taylor		
Printed name	Jennifer J. Taylor, Ph.D.		
Date	August 4, 2005	Reg. No.	48,711

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

EV550719632

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application Serial No. 09/754,926
Filing Date ....January 4, 2001
Inventor..........Kie Y. Ahn et al.
Assignee..........Micron Technology, Inc.
Group Art Unit..........2813
Examiner ....Kielin, Erik J.
Attorney's Docket No. MI22-1533
Title: Methods of Forming Assemblies Comprising Silicon-Doped Aluminum Oxide

RESPONSE TO JULY 25, 2005 NOTIFICATION OF NON-COMPLIANT APPEAL BRIEF

In reply to the Notification of Non-Compliant Appeal Brief dated, July 25, 2005, Appellant submits herewith an Amended Brief. The Notice indicates that appendices IX and X are missing from the original brief. The Brief of Appellant is amended to include such appendices. Consideration of such Amended Brief is respectfully requested.

Respectfully submitted,

Dated: August 4, 2005

By: Jennifer J. Taylor

Jennifer J. Taylor, Ph.D.
Reg. No. 48,711

EV550719632

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application Serial No. 09/754,926
Filing Date ....January 4, 2001
Inventor..................Kie Y. Ahn et al.
Assignee..................Micron Technology, Inc.
Group Art Unit..................2813
Examiner ....Kielin, Erik J.
Attorney's Docket No. MI22-1533
Title: Methods of Forming Assemblies Comprising Silicon-Doped Aluminum Oxide

AMENDED BRIEF OF APPELLANT

To: MS Appeal Brief - Patents
Assistant Commissioner for Patents
Washington, D.C. 20231

From: Jennifer J. Taylor, Ph.D. (Tel. 509-624-4276; Fax 509-838-3424)
Wells St. John P.S.
601 W. First Avenue, Suite 1300
Spokane, WA 99201-3828

Appellant appeals from the February 18, 2005 Final Office Action rejecting claims 3, 5, 6, 8-10 and 31-33, and amends the original brief filed on July 14, 2005 in accordance with the requirements set forth in the Notification of Non-Compliant Appeal Brief dated July 25, 2005. A check in the amount of $ 500.00 in payment of the fees required under 37 CFR § 41.20(b)(2) was submitted with the originally filed brief.

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST.

The real party in interest of this application is Micron Technology, Inc. as evidenced by the assignment of the pending application to such party recorded at reel 011427, frames 0879-0883 on January 4, 2001, in the Assignment Branch of the Patent and Trademark Office.

II. RELATED APPEALS AND INTERFERENCES.

An Appeal Brief pertaining to Appellant's co-pending application No: 10/012,677 is being filed simultaneously with the present Appeal Brief. The 10/012,677 application is a divisional application of the present application. The Board's decision in either the present appeal or the appeal filed in co-pending application No: 10/012,677 could potentially have bearing on the Board's decision in the other application.

III. STATUS OF THE CLAIMS.

Claims 3, 5, 6, 8-10 and 31-33 are pending in the application with claims 1, 2-4, 7 and 11-30 being previously canceled from the application. Claims 3, 5, 6, 8-10 and 31-33 stand finally rejected and are the basis for the present appeal.

IV. STATUS OF AMENDMENTS.

No amendments have been filed in the application subsequent to final rejection.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER.

A concise explanation of the invention defined in the claims that are the subject of the present appeal follows. The invention pertains to methods of forming assemblies comprising silicon-doped aluminum oxide. Referring to Fig. 2 of Appellant's specification, the method includes forming a layer 14 of silicon-doped Al_2O_3 over a semiconductor substrate 12. As described at page 8 of Appellant's specification, in accordance with the invention a porous Al_2O_3 film can be formed by evaporation of aluminum oxide and thermal evaporation of silicon monoxide to result in incorporation of silicon dopant into the aluminum oxide film during the formation of the film. As described at page 9, lines 1-4, oxygen can be contributed to the aluminum oxide from evaporated silicon monoxide while silicon from the silicon monoxide becomes incorporated as dopant within the aluminum oxide film. The relative concentration of silicon within the film can be adjusted by controlling the evaporation rate of silicon monoxide as discussed in Appellant's specification at page 9, lines 5-13. The film can preferably have at least 0.1 weight percent of silicon dopant and up to 30 weight percent of silicon dopant within the aluminum oxide.

Methodology for formation of the silicon-doped Al_2O_3 films is set forth at page 9, line 14 through page 13, line 7. As set forth at page 10, lines 15-1, oxygen can be precluded from flowing into the reaction chamber during formation of the Al_2O_3 layer. An aluminum

oxide source is utilized for evaporation of aluminum oxide and can be, for example, single crystal sapphire as set forth at page 10, lines 16-19. Evaporation of aluminum oxide can utilize electron gun evaporation, thermal evaporation and/or ion beam evaporation as set forth at page 8, lines 17-20. As indicated at page 9, lines 17-19 the semiconductive substrate can comprise silicon, for example, monocrystalline silicon. A separate source is utilized for silicon monoxide evaporation and can involve thermal evaporation for depositing onto a "cold" (room temperature) substrate as described at page 11, lines 18-23.

As discussed at page 11, lines 3-8, the evaporated silicon monoxide and evaporated aluminum oxide form a vapor mixture of aluminum oxide and silicon monoxide which are then co-condensed onto the substrate to form dielectric layer 14.

The claimed methodology can additionally include implanting a conductivity-enhancing dopant into the substrate through the layer of silicon-doped Al_2O_3 as described in the specification text at page 14, lines 1-14, and as illustrated at Figs. 4 and 5. A conductive material can be formed on the deposited silicon-doped porous aluminum oxide where the conductive material is separated from the semiconductive material of the substrate by the silicon-doped porous aluminum oxide as set forth in Fig. 3 and the text at page 13, lines 8 19.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL.

The grounds of rejection presented for review and the Office's position are concisely set forth as follows.

A. The rejection of independent claim 33 under 35 U.S.C. § 103(a).

Claim 33 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over a combination of U.S. Patent No. 5,923,056 issued to Lee et al. (henceforth "Lee") and Vossen and Kern "Thin Film Processes II" (1991) pages 80-81, 108-110, 113-115, 188 and 200 (henceforth "Vossen and Kern"). In the Office Action dated February 18, 2005 (henceforth "Action") the Office indicates reliance upon Lee as disclosing various structures comprising doped metal oxide such as silicon-doped aluminum oxide. As acknowledged in the Action, the methodology disclosed by Lee involves sputtering from an aluminum target which contains 1% silicon within a chamber in the presence of argon and oxygen (Action page 9, section 3). Lee is indicated as being further relied upon as disclosing a conductive material 13 over the insulating layer 18 (Action at page 10). The Office acknowledges that Lee fails to disclose evaporation of silicon monoxide, fails to disclose utilization of sapphire as a source of aluminum oxide, and fails to disclose evaporation from separate sources.

The Office relies on Vossen and Kern as disclosing methods of forming thin films using two-source sputtering. At page 10 of the present Action, the Office indicates that Vossen and Kern discloses "numerous examples of mixed composition films formed using separate evaporative sources". Table 3 is relied upon by the Office as disclosing sources of aluminum oxide and silicon monoxide and further relies on Vossen and Kern as disclosing separately controlling deposition rates of each component (Action at pages 10-11).

The Office contends that it would be obvious to use a silicon monoxide source and an aluminum oxide source with controlled evaporation rate without additional oxygen because "the choice of SiO and Al_2O_3 sources are well known and will result in the

same silicon-doped aluminum oxide as that disclosed in Lee" since Lee discloses that conventional deposition techniques such as sputtering can be utilized and Vossen and Kern teaches that "controlled deposition rate" of each component is conventional.

The Office further contends that it would be obvious to preclude oxygen "since each of SiO and Al_2O_3 already provide oxygen".

B. The rejection of independent claim 10 and claims 3, 5-6, 8-9 and 31-32 which depend therefrom under 35 U.S.C. § 103(a).

Independent claim 10 and its dependent claims 3, 5, 6, 8, 9, 31 and 32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Lee and Vossen and Kern in further view of Fujisada, JP 60-167352 (hereinafter "Fujisada"), Wolf "Silicon Processing for the VLSI Era", Vol. 1 (1986), pages 5 and 323 (hereinafter "Wolf-1") and Wolf "Silicon Processing for the VLSI Era", Vol. 2 (1990), pages 354-356 (hereinafter "Wolf-2"). The combination of Lee and Vossen and Kern is relied upon by the Office as discussed above with respect to independent claim 33.

Fujisada is indicated as being relied upon by the Office as disclosing sputter-deposited aluminum oxide using a sapphire target. Wolf-2 is relied upon as disclosing implantation of n-type or p-type dopants through a gate oxide layer. Wolf-1 is indicated as being relied upon as disclosing benefits of implantation through a thin oxide layer (Present action at page 6).

The Office contends that it would be obvious to utilize sapphire as an aluminum oxide source for the methods disclosed by Lee in view of Vossen and Kern "to prevent contamination of the deposited film as taught by Fujisada". The Examiner further

indicates that it would be obvious for one of ordinary skill in the art to implant dopant through the gate oxide layer disclosed by Lee because "Wolf-2 shows that implantation through a gate oxide layer is conventional".

VII. ARGUMENTS.

A. The rejection of independent claim 33 should be overturned since a *prima facie* case of obviousness has not been established.

In accordance with MPEP §§ 2142 and 2143, a proper obviousness rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine reference teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. In order to establish a *prima facie* case of obviousness, each of these three factors must be shown, the burden of which is upon the Office (MPEP § 2142). Appellant respectfully submits that the Office has failed to meet this burden, no *prima facie* case has been established and that claim 33 is therefore allowable.

Referring to claim 33, such recites formation of a layer of silicon-doped aluminum oxide by depositing a vapor mixture which is formed within a reactor by evaporating aluminum oxide from a first source and evaporating silicon monoxide from a second source comprising silicon monoxide. Claim 33 additionally recites that O_2 is precluded from flowing into the chamber during evaporation, formation of the vapor mixture and deposition of the silicon-doped aluminum oxide. The amount of silicon present within the layer is controlled by controlling evaporation of silicon monoxide. The primary reference Lee

discloses formation of a silicon-doped thin film by sputtering from an aluminum target containing 1% silicon in an argon/oxygen atmosphere (column 5, lines 59-63). Such disclosure does not teach or in any way suggest the claim 33 recited evaporating silicon monoxide from a second source comprising silicon monoxide, or the recited forming a vapor mixture comprising evaporated aluminum oxide and evaporated silicon monoxide, or the recited controlling an amount of silicon present in the formed layer by controlling the evaporation of silicon monoxide, or the recited preclusion of O_2 from flowing into the chamber.

The Office expresses the opinion that the methodology recited in claim 33 would be obvious because Lee indicates that a described dielectric material can be formed by "a conventional deposition technique such as sputtering" at column 2, lines 15-21. Appellant notes that the sputtering techniques described specifically in Lee are very different from Appellant's recited method in that Lee's process utilizes an aluminum target specifically with 1% by weight silicon distributed uniformly therein for forming silicon-doped films (column 5, lines 62-65 of Lee). It would be improper for the Office to contend that Appellant's technique is "conventional" technique when the Office has no reference specifically describing appellant's technique. Vossen and Kern describe evaporation of aluminum oxide generally and evaporation of silicon monoxide generally but has no teaching of two-source systems utilizing aluminum oxide and silicon monoxide. Although the Vossen and Kern reference has a table indicating that two-source evaporation systems are known for several listed materials, the reference notably does not include a two-source evaporation system of aluminum oxide and silicon monoxide within the table. Accordingly, the combination of references does not teach or suggest the claim 33 recited two-source

methodology for forming a vapor mixture and depositing at least some of the mixture to form silicon doped aluminum oxide.

Appellant respectfully submits that it is improper for the Office to contend that the listed two-source evaporation systems of Vossen and Kern can be extended to Appellant's recited system without some teaching of a reason for making such system and a reasonable expectation of success. The only disclosed record which teaches a reason for forming a two-source evaporating system comprising aluminum oxide from a first source and silicon monoxide from a second source is the text of Appellant's own application. It is improper to base a suggestion for combining references or to base the reasonable expectation of success of making a proposed modification of a reference on appellant's disclosure rather than the prior art (MPEP § 706.02(j)). Since the only teaching or suggesting of mixing evaporated aluminum oxide with evaporated silicon monoxide in any context and specifically in the context of forming silicon-doped aluminum oxide over a silicon substrate is in Appellant's disclosure. The cited references fail to show that the prior art would teach or suggest all off the limitations of claim 33.

The Office states at page 11 of the present Action that it would be obvious to use a silicon monoxide source and an aluminum oxide source to form a silicon-doped aluminum oxide because "the choice of SiO and Al_2O_3 sources are well known and result in the same silicon-doped aluminum oxide as that disclosed in Lee". Appellant again notes that the only suggestion or indication that the recited two-source method will produce the recited silicon-doped aluminum oxide is provided within appellant's own specification. Accordingly, the statement of the Examiner, which lacks any basis or foundation in the prior art, is conclusory. The cited references therefore fail to provide a basis for a reasonable

expectation of success.

The Office further contends that it would be obvious to preclude O_2 from flowing into the chamber during evaporation mixing and deposition as recited in claim 33 “since each of SiO and Al_2O_3 already provide oxygen such that no additional oxygen is necessary” (Action at page 11). The Office indicates reliance upon Vossen and Kern at Table 2, page 108, “where no additional oxygen is fed during deposition of Cr-SiO composite film”. It is noted that Lee discloses formation of silicon doped aluminum oxide with specific indication that such formation is an oxygen atmosphere (col. 5, ll. 59-67). Vossen and Kern does not disclose or suggest formation of any silicon-doped aluminum oxide material. The disclosure of forming a Cr-SiO composite film in an absence of additional oxygen as relied upon by the Office does not support the Office’s contention that “no additional oxygen is necessary” to form the recited Al_2O_3 doped with silicon. Further, the Lee disclosure which specifies an oxygen atmosphere as combined with Vossen and Kern, which does not disclose or suggest any formation of silicon doped aluminum oxide, fails to provide a basis for a reasonable expectation of achieving the claim 33 recited silicon-doped aluminum oxide while precluding O_2 from the chamber.

The Office indicates at page 11 of the Action with respect to the claim 33 recited element of controlling an amount of silicon present by controlling evaporation of silicon monoxide, that Vossen and Kern teach deposition rate of each component must be separately controlled to ensure the composition of the deposited layer is as desired. It is noted that the general disclosure of <u>controlling deposition rates</u> of individual components does not teach or suggest the claim 33 recited <u>controlling the evaporation</u> of silicon monoxide. Nor does the relied upon indication of a controlled deposition rate provide a

reasonable expectation of achieving the recited controlling amount of silicon present by controlling evaporation of silicon monoxide.

With respect to the motivation element to support a *prima facie* obviousness rejection, the present action fails to provide any basis for motivation of the relied upon combination other than conclusory statements. The Federal Circuit discussed proper motivation in *In re Lee*, 61 USPQ 2d 1430 (Fed. Cir. 2002). In the Lee case, the Court stated that the factual inquiry whether to combine references must be based on objective evidence of record. Additionally, the Court in *In re Fritch*, 23 USPQ 2d 1780, 1783 (Fed. Cir. 1992) stated motivation is provided only by showing some objective teaching in the prior art, or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. The Court in *Lee* stated that the Examiner's conclusory statements in the *Lee* case do not adequately address issues of motivation to combine. The Court additionally stated that the factual question of motivation is material to patentability and cannot be resolved on subjective believe and unknown authority. The Court further stated that deficiencies of cited references cannot be remedied by general conclusions about what is basic knowledge or common sense, and indicated that the determination of patentability must be based on evidence.

In the instant case the record is entirely devoid of any evidence to support motivation to combine the teachings apart from the bald conclusory statements of the Examiner which are insufficient for proper motivation as set forth by the Federal Circuit. In particular, the Office has provided no evidence for the conclusory statements that independent SiO and Al_2O_3 sources "will result in the same silicon-doped aluminum oxide

as that disclosed in Lee" or the contention that "each of SiO and Al_2O_3 already provide oxygen such that no additional oxygen is necessary".

As set forth above, the cited combination of Lee and Vossen and Kern fails to disclose or suggest each and every element of claim 33, fails to provide motivation for the combination and fails to provide a basis for a reasonable expectation of success. Accordingly, a *prima facie* case of obviousness has not been established with respect to independent claim 33. Accordingly, claim 33 is allowable over the art of record.

B. The rejection of independent claim 10 and its dependent claims 3, 5, 6, 8, 9, 31 and 32 should be overturned for failure to establish a *prima facie* case of obviousness.

Referring to claim 10, such recites evaporating aluminum oxide and evaporating silicon monoxide form an independent source, and forming a vapor mixture comprising evaporated aluminum oxide and evaporated silicon monoxide to deposit a layer of Al_2O_3 doped with silicon atoms. Claim 10 additionally recites precluding oxygen from flowing into the chamber during evaporating, forming a vapor mixture and depositing, and controlling the amount of silicon present by controlling evaporation rate of silicon monoxide. Since each of these features are recited in independent claim 33, the discussion of claim 33 with respect to the Lee and Vossen and Kern references applies equally to independent claim 10. Accordingly, claim 10 is not rendered obvious by the combination of Lee and Vossen and Kern for at least reasons similar to those discussed above with respect to independent claim 33.

None of the additionally relied upon references (Wolf-1, Wolf-2 and Fujisada)

disclose, suggest or contribute towards suggesting the claim 10 recited two-source evaporation system and deposition of silicon-doped aluminum oxide, the recited precluding oxygen from flowing into the chamber, or the recited controlling the amount of silicon present by controlling the evaporation rate of silicon monoxide. Therefore the combination of Lee, Vossen and Kern, Wolf-1, Wolf-2 and Fujisada does not disclose or suggest each and every element in claim 10. Further, not one of Fujisada, Wolf-1 or Wolf-2 contributes toward providing a basis of reasonable expectation of achieving the claim 10 recited silicon-doped aluminum oxide utilizing the recited deposition methodology.

Independent claim 10 further recites that aluminum oxide is evaporated from a single crystal sapphire. The Office indicates reliance upon Fujisada as disclosing a sapphire target. The Office states that "sapphire is necessarily single crystal because that which distinguishes aluminum oxide from sapphire is only the fact that sapphire is a single crystal of aluminum oxide" (present Action at page 6). It is noted that in Appellant's response to the previous Action dated February 3, 2003, appellant specifically requested reconsideration of such position and invited exploration of numerous internet websites describing "polycrystalline sapphire" and the properties thereof (without direction to any specific web site). In subsequent actions, including the present Action, the Office maintains its position without addressing appellant's previous indication of distinction between single crystal sapphire as recited in claim 10 and alternative forms of sapphire. Nor does the Office provide any support for the contention that "sapphire is necessarily single crystal". Accordingly, such statement is conclusory and unsupported and is therefore unfounded.

Independent claim 10 is additionally allowable on the grounds that the combination of references fails to disclose or suggest the recited implanting a conductivity-enhancing dopant into the substrate through the layer of silicon-doped Al_2O_3. The Office relies upon Wolf-1 and Wolf-2 as disclosing implantation of dopants through a gate oxide insulating layer, and contends that in light of Wolf-1 and Wolf-2 it would be obvious to implant dopant through the gate oxide layer of Lee because "implantation through the gate oxide layer is conventional". Appellant notes however, that the general disclosure of implanting a dopant through a gate oxide along with Wolf's specific indication that gate oxide is SiO_2 (page 333, lines 19-20) does not disclose or suggest the recited silicon-doped aluminum oxide or in anyway suggest implantation could be achieved through silicon-doped aluminum oxide material. Lee does not disclose or suggest implanting dopant through a layer of silicon-doped Al_2O_3. Accordingly, in combination, utilization of a silicon-doped aluminum oxide as disclosed by Lee and the general disclosure of implanting dopant through a SiO_2 gate oxide layer as disclosed by Wolf-2 does not suggest the claim 10 recited implanting dopant into a substrate through a layer of silicon-doped Al_2O_3. The Examiner indicates motivation for combining Wolf-2 and Lee based on the Wolf-1 disclosure that oxide prevents contamination during implanting. However, Wolf-1 does not contribute toward suggesting the claim 10 recited implanting through a layer of Al_2O_3 doped with silicon atoms. Nor does the combination of Lee, Wolf-1 and Wolf-2 provide a reasonable expectation of achieving the recited implanting dopant into a substrate through a layer of Al_2O_3 doped with silicon atoms.

As discussed above, the combination of Lee and Vossen and Kern, or this

combination in further view of Fujisada, Wolf-1 and Wolf-2, fails to disclose or suggest each and every element recited in independent claim 10. Further, the relied upon combination of references fails to provide a reasonable expectation of successfully achieving the claim 10 recited silicon-doped aluminum oxide utilizing the two-source system in an absence of oxygen, controlling the amount of silicon present in the silicon-doped aluminum oxide by controlling the evaporation rate of silicon monoxide or the recited implanting dopant into the substrate through Al_2O_3 doped with silicon atoms. Therefore a *prima facie* case of obviousness has not been established relative to independent claim 10 and such claim is allowable over the art of record.

Dependent claims 3, 5, 6, 8, 9, 31 and 32 are allowable over the cited combination of Lee, Vossen and Kern, Wolf-1, Wolf-2 and Fujisada for at least the reason that they depend from allowable base claim 10.

C. Rejection of dependent claim 31 under 35 U.S.C. § 103(a) should be overturned for at least the reasons discussed above and because dependent claim 31 recites independently patentable subject matter.

In addition to the features recited in dependent claim 10, claim 31 recites silicon-doped porous aluminum oxide containing from 0.1 percent to about 30 weight percent of silicon dopant. At page 8 of the Action, the Office indicates reliance upon Lee as disclosing dopant in the dielectric film in the range of 0.1 to 30 weight percent. However, nothing in Lee provides a basis of reasonable expectation of achieving the

claim 31 recited weight percent of silicon dopant within a silicon-doped aluminum oxide utilizing methodology comprising evaporating silicon monoxide from a source comprising silicon monoxide and evaporating aluminum oxide from single crystal sapphire. Not one of the additionally recited references (Wolf-1, Wolf-2, Vossen and Kern and Fujisada) contribute toward suggesting this recited feature or providing a basis for a reasonable expectation of achieving the recited dopant content by the recited methodology. Accordingly, dependent claim 31 is allowable as depending from an allowable base claim and for reciting additionally patentable subject matter.

D. Conclusions

For the reasons discussed above, claims 3, 5, 6, 8-10 and 31-33 are allowable over the art of record. In view of the forgoing, reversal of the final rejection of claims 3, 5, 6, 8-10 and 31-33 is respectfully requested. Allowance of such claims is also requested.

Respectfully submitted,

Dated: August 4, 2005

By: Jennifer J. Taylor
Jennifer J. Taylor
Reg. No. 48,711

VIII. CLAIMS APPENDIX.

Claims 3, 5, 6, 8-10 and 31-33 which stand rejected and are the basis of the present appeal are presented below.

3. The method of claim 10 wherein the evaporating the aluminum oxide comprises thermal evaporation of the aluminum oxide from the single crystal sapphire.

5. The method of claim 10 wherein the evaporating the aluminum oxide comprises ion beam evaporation of the aluminum oxide from the single crystal sapphire.

6. The method of claim 10 wherein the evaporating the aluminum oxide comprises electron gun evaporation of the aluminum oxide from the single crystal sapphire.

8. The method of claim 10 wherein the substrate comprises silicon.

9. The method of claim 10 wherein the substrate comprises monocrystalline silicon.

10. A method of forming an assembly comprising silicon-doped porous aluminum oxide, comprising:

evaporating aluminum oxide from a single crystal sapphire;

evaporating silicon monoxide from a source comprising silicon monoxide;

forming a vapor mixture comprising the evaporated aluminum oxide and evaporated silicon monoxide in a reaction chamber;

depositing at least some of the evaporated aluminum oxide and silicon from the silicon monoxide on a semiconductive material substrate to form a layer of Al_2O_3 doped with silicon atoms on the substrate, some of the oxygen present in the Al_2O_3 being contributed by the silicon monoxide, an amount of silicon present in the silicon-doped aluminum oxide being controlled by controlling the evaporation rate during the evaporating silicon monoxide;

precluding O_2 from flowing into the chamber during the evaporating aluminum oxide, during the evaporating silicon monoxide, during the forming a vapor mixture and during the depositing;

implanting a conductivity-enhancing dopant into the substrate through the layer of Al_2O_3 doped with silicon atoms; and

forming a conductive material on the deposited silicon-doped porous aluminum oxide, the conductive material being separated from the semiconductive material of the substrate by the silicon-doped porous aluminum oxide.

31. The method of claim 10 wherein the silicon-doped porous aluminum oxide contains from 0.1 percent to about 30 weight percent of silicon dopant, by weight.

32. The method of claim 10 wherein the semiconductive material substrate is room temperature during the depositing.

33. A method of forming an assembly comprising silicon-doped aluminum oxide, the method comprising:

evaporating aluminum oxide from a first source;

evaporating silicon monoxide from a second source comprising silicon-monoxide;

forming a vapor mixture within a reaction chamber, the vapor mixture comprising the evaporated aluminum oxide and evaporated silicon monoxide;

depositing at least some of the vapor mixture on a semiconductor substrate to form a layer of silicon-doped Al_2O_3;

precluding O_2 from flowing into the chamber during the evaporation the aluminum oxide and silicon monoxide, during forming the vapor mixture and during the depositing; and

controlling an amount of silicon present within the layer of Al_2O_3 by controlling the evaporation of silicon monoxide.

IX. EVIDENCE APPENDIX.

None entered

X. RELATED PROCEEDINGS APPENDIX.

No decisions entered to date.